Lab 5: FIR Filter Design

Name: Peng Guo
GTID: 903424176

1. Tables

a) Resources

i. Slice Logic

Site Type	Used	Fixed	Available	Util%
Slice LUTs	549	0	20800	2.64
LUT as Logic	549	0	20800	2.64
LUT as Memory	0	0	9600	0.00
Slice Registers	496	0	41600	1.19
Register as Flip Flop	496	0	41600	1.19
Register as Latch	0	0	41600	0.00
F7 Muxes	0	0	16300	0.00
F8 Muxes	0	0	8150	0.00

ii. IO and GT Specific

Site Type	Used	Fixed	Available	Util%
Bonded IOB	34	0	106	32.08
IOB Master Pads	16			
IOB Slave Pads	17			
Bonded IPADs	0	0	10	0.00
Bonded OPADs	0	0	4	0.00
PHY_CONTROL	0	0	5	0.00
PHASER_REF	0	0	5	0.00
OUT_FIFO	0	0	20	0.00
IN_FIFO	0	0	20	0.00
IDELAYCTRL	0	0	5	0.00
IBUFDS	0	0	104	0.00
GTPE2_CHANNEL	0	0	2	0.00
PHASER_OUT/PHASER_OUT_PHY	0	0	20	0.00
PHASER_IN/PHASER_IN_PHY	0	0	20	0.00
IDELAYE2/IDELAYE2_FINEDELAY	0	0	250	0.00
IBUFDS_GTE2	0	0	2	0.00
ILOGIC	0	0	106	0.00
OLOGIC	0	0	106	0.00

iii. Primitives

Ref Name	Used	Functional Category
FDRE	496	Flop & Latch
LUT2	350	LUT
CARRY4	142	CarryLogic
LUT4	69	LUT
LUT3	66	LUT
LUT5	53	LUT
LUT1	53	LUT
LUT6	52	LUT
OBUF	22	IO
IBUF	12	IO
BUFG	1	Clock

b) Power

Total On-Chip Power (W)	0.077
Dynamic (W)	0.007
Device Static (W)	0.070
Effective TJA (C/W)	5.0
Max Ambient (C)	84.6
Junction Temperature (C)	25.4
Confidence Level	Low
Setting File	---
Simulation Activity File	---
Design Nets Matched	NA

Dynamic: 0.007W
Static: 0.070W

c) Worst Negative Slack

Design Timing Summary

WNS(ns)	TNS(ns)	TNS Failing Endpoints	TNS Total Endpoints	WHS(ns)	THS(ns)
4.395	0.000	0	972	0.158	0.000

THS Failing Endpoints	THS Total Endpoints	WPWS(ns)	TPWS(ns)	TPWS Failing Endpoints	TPWS Total Endpoints
0	972	4.500	0.000	0	497

2. Question and Answer

Question: Why do you think we need to do right shift operation? And why do we do it at the end? (Answer should not exceed 6 sentences)
Answer: For the convenience of design, we have previously expanded the coefficient by 512 to facilitate the calculation, so finally divide the result by 512, that is, shift 9 bits to the right. If we do the operation in the middle process, it may affect the accuracy of subsequent calculations, and the number in the middle

process may be too small after dividing by 512, which is not convenient for subsequent calculations.